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BIOLOGICAL NOTES ON DIPTERA.

(Galls on *Solidago*.)

BY R. OSTEN SACKEN.

Five galls, produced by N. American Diptera on the golden rod (*Solidago*) have hitherto been described; the history of three of them is complete, as the insect, producing them, has also been described; (*Trypeta solidaginis* Fitch, *Cecid. solidaginis* Lw; *Cec. hirtipes* O. S.); two have been named in anticipation of the discovery of the insect (*Cec. racemicola* O. S. and *Cecid. carbonifera* O. S.).

To this number I can now add three more galls from which I have bred the following insects; *Trypeta polita* Lw., *Asphondylia monacha* n. sp. and *Cecidomyia anthophila* n. sp.

These eight galls, produced by Diptera on *Solidago*, may be classified as follows:

1.—Smooth swelling of stem or branch; *Trypeta solidaginis* Fitch; *Cecidomyia hirtipes* O. S.

2.—Accumulation of leaves in consequence of the arrest of growth of stem or branch; *Trypeta polita* Lw., *Cecidomyia solidaginis* Lw., *Asphondylia monacha* n. sp.

3.—Enlargement of bud on flower, amongst the racemes; *Cecid. racemicola* O. S., *Cecid. anthophila* n. sp.

4.—Hardened spot on the leaves; *Cecid. carbonifera* O. S.

(The descriptions of the two *Trypetæ*, as well as that of the above mentioned *Cecidomyiæ* and their galls, may be found in the first volume of the *Monographs of North America Diptera*).

ASPHONDYLIA MONACHA, n. sp.

The gall of *A. monacha*, like that of *Cecidomyia solidaginis*, consists of an accumulation of leaves upon a stem or branch the growth of which has been stunted by the operation of the insect. Several branchlets being stunted in this way alongside of each other, form a more or less elongated head, sometimes several inches long, consisting of an accumulation of leaves. This head, at least the specimen which I have before me, is more elongated, less stout than the heads of *Cec. solidaginis* which I have seen. But the principal difference lies in its inner structure. The leaves forming the inner part of the gall of *Asph. monacha* although stunted in their growth, have none of the characteristic appearance of the numerous narrow ribbond-like leaves, surrounding a central cell, in the gall of *Cec. solidaginis*; (compare *Monograph*, etc., l. c. Tab. 1, f. 9, 10).

These galls, collected by me in September 1867, near Brooklyn, L. I., on *Solidago altissima*, very soon gave me several specimens of the fly.

***Asphondylia monacha* n. sp.**—Nigra, tarsorum basi nivea.

Black, basis of the tarsi snow-white.

Body blackish, clothed with black hairs (dry and somewhat faded specimens look brownish, with an admixture of yellow hairs); feet with a deep black, appressed pubescence; the short first tarsal joint and the basis of the second are snow-white; knees likewise whitish. Wings clothed with blackish hairs, especially dense along the anterior border; the venation shows nothing extraordinary, being like that of *Cecidomyia* or *Diplosis* (*Monographs* etc., 1, page 174, fig. 1 and 2), that is, it consists of three veins, the last of which is forked; the second vein is nearly straight and ends almost in the middle of the apex of the wing; the anterior branch of the fork of the third vein is concealed in a fold, running backwards to the root of the wing, which produces the appearance as if there were four longitudinal veins (somewhat like fig. 5 on the above quoted page of the *Monographs*); in order to perceive the real direction of the anterior branch of the fourth vein a very close examination of a denuded wing is necessary. The antennæ are $2 + 12$ jointed, filiform, pubescent; the joints of the flagellum are cylindrical, of nearly equal, gradually diminishing length up to the ninth; the tenth is smaller than the ninth; the two last joints, the eleventh and twelfth, taken together are about equal to the tenth in length; they are short, button shaped. Halteres black.

I have two male and a female specimens before me, which I regret not to have described when they were alive; I merely took a note relative to the structure of the antennæ of one of the specimens, but forgot to observe its sex. As described by me, the antenna of *A. monacha* is exactly like that of *A. sarothamni* ♀ figured by Winnertz (*Linneæ Entomologica* Tab. iv, f. 2 b); the antennæ of the male of this species have one joint more, that is, $2 + 13$ joints. Owing to the present dry condition of my specimens I am unable to say whether the same difference exists in *A. monacha*. My female specimen shows, at the end of the body, a long, yellowish, almost cylindrical ovipositor, nearly like that of *A. sarothamni*, figured by Winnertz (l. c. Tab. 1, f. 15). But it does not show the long, needle-shaped, horny organ which appears on Mr. W. figure as protruding beyond the cylindrical joint of the ovipositor, and is also mentioned in the description. The character mentioned by Mr. Winnertz (l. c. p. 185) as belonging to *Asphondylia*, that "the second longitudinal vein reaches the margin beyond the apex of the wing," does not seem to be essential to the genus, as it is not to be found in *A. monacha*.

The pupa, immediately before the exclusion of the fly, extricates itself from the gall and falls to the ground. In this *Asphondylia monacha* again differs from *Cec. solidaginis*; the extremely light and fragile pupa case of the latter remains hanging on the outside of the gall

after the escape of the insect. The pupa case of *A. monacha* has a much harder consistency, has two contiguous, short, subconical, pointed projections at the top of the head, (exactly like the pupa of a *A. sarothamni* figured by Mr. Winnertz l. c. Tab. 1, f. 6.) The dorsal segments of the abdomen are covered in the middle with a number of small points; the last segment, at the tip, has a crown of such points.

As far as I know, six european *Asphondylia* are described; most of them develop in the buds of flowers, or produce galls. In the *Monographs of N. A. Diptera*, Vol. 1, p. 7, Mr. Loew made the suggestion that "*Cec. grossulariæ* Fitch, ought, as it seems, to be referred to the genus *Asphondylia*." But when he made this statement, he could hardly have seen Dr. Fitch's description of the antennæ of this species, the joints of which are "separated by hyaline pedicels one third as long as the joints, which are short cylindrical, with rounded ends, their length scarcely more than double their breadth." It results from this description that *Cec. grossulariæ* Fitch cannot be an *Asphondylia*, and that *A. monacha* is the first N. A. species hitherto described.

But I possess in my collection an undescribed species communicated to me by Mr. Walsh some time ago under the name of *Cecid. helianthi globulus* Walsh in litt., which is an *Asphondylia*. The pupa has the same coriaceous, hard consistency as that of *A. monacha*; the dorsal segments of the abdomen of the pupa are likewise muricate and the end of the abdomen has a crown of little spines; the two horny frontal projections are likewise contiguous, only much smaller than those of the pupa of *A. monacha*.

It results from the foregoing that, as far as observed, the characters of *Asphondylia* consist principally in the structure of the antennæ (cylindrical, elongated, sessile or nearly sessile joints, pubescent, without verticils; their number the same, or nearly the same in both sexes), and in the elongated ovipositor of the female; to which may be added the structure of the pupa-case, which is of a rather tough consistency, is muricate on the dorsal segments of the abdomen and has the frontal pointed projections *contiguous*, and not remote as in many other *Cecidomyidæ*.

TRYPETA POLITA, Loew.

I have been fortunate enough to trace the history of this pretty fly, described and figured in the *Monographs*, etc. Vol. 1, page 77, Tab. II, fig. 12. It produces galls, not unlike small Brussels sprouts in appearance, caused by the arrest of the growth of the side branches of *Solidago altissima*. The accumulation of leaves produced by this stunting

is a little over half an inch long, sometimes much smaller; on the inside there is a comparatively large hollow space, containing the pupa. Some of the galls were nearly sessile on the central stalk of the plant; in other cases, the branch had grown an inch or two before being deformed by the gall. In some cases from four to six galls occupied the end of the stalk. The flies after escaping leave a whitish, transparent pupa-case inside of the gall. I found these galls quite frequently near New London Conn., and in the environs of Brooklyn, L. I. As several of the specimens collected by me produced flies about the middle of September and as *T. polita*, if I remember right, is frequently found in the spring and in summer, the question remains to be solved whether the flies hibernate, or whether some of them remain quiescent within the pupa until the next season?

CECIDOMYIA ANTHOPHILA n. sp.

Among the racemes of *Solidago* I observed (in September 1867, near Brooklyn, L. I.) that some of the flowerlets were deformed into a gall, somewhat analogous to that of *Cecid. racemicola* O. S. (*Monographs*, Vol. I, p. 196), on account of the mode of its occurrence, but different in structure. The new gall is elongated-conical, blunt at the end, about 0.25—0.3 of an inch long; the basis about 0.1 broad; the surface is pale green, covered with a white down; the inside of the gall is hollow, divided in two compartments by a delicate, somewhat funnel-shaped membrane, placed about the middle of the cavity, point upwards. At the bottom of the lower compartment, that is, at the lower and broader end of the gall, the small, whitish larva may be found; it shows no sign of a breast-bone, except two, exceedingly minute black dots, visible only under a very strong lens. Towards the end of September, numerous *Cecidomyiæ* were obtained from these galls. Unfortunately, I have preserved only a few specimens, all males. Thus I am unable to state, whether the antennal joints in the female are pedicelled, as in the male, or sessile. The structure of the antennæ renders it apparent that this species belongs to the genus *Cecidomyia*, in the narrower sense, and not to *Diplosis*.

Cecidomyia anthophila n. sp. ♂.—The pale brown antennæ count 2 + 19 joints;* those of the flagellum are nearly as long as their pedicels; the length of each joint is nearly double of its breadth; the shape of the single joints is somewhat square (otherwise the flagellum is not unlike Tab. I, f. 5 of *Monographs*, etc. Vol. I). Thorax pale brown, shining above; a spot on the humeri is pale yellowish; stripes hardly indicated by rows of hairs; pleuræ brownish in front,

* It must be borne in mind that the number of joints of the flagellum in *Cecidomyia* sensu str. is often not quite constant in the same species.

which color extends to the mesosternum (the interval between the first and second pair of coxæ); the posterior part of the pleuræ is yellowish, which color surrounds the root of the wings, even encroaching upon the mesonotum, and extends towards the hind coxæ, without reaching them; the halteres are inserted on brown ground; they are brownish but the basal half of their stem is pale yellow; the scutellum brownish anteriorly, is yellowish posteriorly; the metathorax is yellowish anteriorly, brownish posteriorly. Abdomen brown, hairy; male genitals yellowish-brown. Feet brownish, underside with a whitish reflection; (when denuded, the feet appear pale). The first joint of the tarsi, as usual, is very short; the second is about equal in length to the three following taken together; (the relation of these four joints is about as follows: $6\frac{1}{2}$. $3\frac{1}{2}$. $2\frac{1}{2}$. 1: it is nearly the same on all feet.) The wings are clothed with grayish hairs; the second longitudinal vein is very gently arcuated; no perceptible cross-vein between the first and the second longitudinal veins. (Description drawn from three dry specimens: males).

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Description of a new genus of PIERIDÆ, and certain new species of butterflies from California.

BY HERMAN BEHR, M. D.

Genus NEOPHASIA, Behr.

Larva ignota.

Imago; caput globuliforme, oculi pro forma thoracis magni prominentes; palpi strictiusculi, capite longiores, compressi, hirsuti, antennæ mediocres in clavam fusiformem desinentes, abdomen gracile alis inferioribus brevius, alæ elongatæ tenerrimæ, cellula discoidalis in medium alarum porrecta. Alarum anticarum angulus superior acutiusculus.

This Genus forms a very natural passage from *Pontia* to *Pieris*. From *Pontia* it differs by the shape of the wing; from *Pieris* by its gauze-like substance, by the shape and proportions of the head and the slenderness of thorax and abdomen.

The shape and position of the discoidal cell separates *Neophasia* from *Leucophasia*.

I know of two species belonging to this genus, both of them inhabitants of the pine forest region of the mountain chains parallel to the coast of the Pacific.

1. N. MENAPIA. (*Pieris menapia*, Felder) is found on a certain elevation of the Sierra Nevada. Of its habits, I only know that it is found in pine forests. Mr. Lorquin, well known by his scientific travels, ventures the opinion that the caterpillar feeds on some coniferous tree, a supposition, that, notwithstanding the unusual food for a Pierid larva, is not altogether so improbable as it appears at first, as, I, myself have found the larva of a true *Pieris*, in South Australia, on a species of *Loranthus*.